

**AMENDMENT AND RESPONSE TO OFFICE ACTION**

**Remarks**

Claims 21-28, 30-38, 40, and 42-50 are pending.

Claim 28 was amended to define that the pulping occurs in a high consistency pulper.

Support for the amendment is found, for example, on page 6, lines 2-3.

Claims 25 and 26 and 34 and 35 define the various enzymes used in the deinking process.

Claims 25, 26, 34 and 35 have been amended so that claims 26 and 35 are specific to cellulases, since the only art cited by the examiner relates to cellulases, and claims 25 and 34 to the remaining enzymes, all of which are described in the original priority application U.S.S.N. 07/518,935 filed May 4, 1990 at page 4.

No new matter is added by these amendments and should be entered on the basis that they remove issues on appeal, as discussed below.

**Rejection Under 35 U.S.C. § 112, first paragraph**

Claims 27, 28, 37, and 38 were rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventor had possession of the claimed invention. Applicants respectfully traverse this rejection.

Analysis

The Examiner alleges that the phrase "alkali is not added to the aqueous medium" in claims 27 and 37 is not disclosed in the specification. Specifically, the Examiner alleges that the

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specification discloses that no alkali is required; however, nothing in the specification excludes the addition of alkaline reagents.

The Examiner is not applying the correct legal standard. The subject matter of the claim need not be described literally (i.e., using the same terms or *in haec verba*) in order for the disclosure to satisfy the description requirement (*see* the Manual for Patent Examining Procedure §2163). The test for sufficiency of support in a parent application is whether the disclosure of the application relied upon “reasonably conveys to the artisan that the inventor had possession at that time of the later claimed subject matter.” *Ralston Purina Co. v. Far-Mar-Co., Inc.*, 772 F.2d 1570, 1575, 227 U.S.P.Q. 177, 179 (Fed. Cir. 1985) (quoting *In re Kaslow*, 707 F.2d 1366, 1375, 217 U.S.P.Q. 1089, 1096 (Fed. Cir. 1983))

Examples 1-3 describe the deinking of wastepaper using cellulolytic and pectinolytic enzymes. The wastepaper is deinked without the addition of alkali such as sodium hydroxide (pages 8-13). The specification clearly discloses deinking performed at a pH between 3 and 8 wherein alkali is not added to the aqueous medium. Therefore, claims 27 and 37 satisfy the written description requirement.

The Examiner also alleges that the phrase “12% or greater” in claim 28 exceeds the range disclosed in the specification. Without making any admissions, and solely for the purpose of facilitating prosecution, claim 28 has been amended to define that the pulping occurs in a high consistency pulper. Support for the amendment is found, for example, on page 6, lines 2-3.

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The Examiner rejected claim 48 under 35 U.S.C. § 112, first paragraph as well.

However, the Examiner did not address claim 48 specifically in the rejection.

**Rejection Under 35 U.S.C. § 103**

Claims 21-27, 30, 41, 45, and 47-50 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Japanese Application 59-9299 (“JP ‘299”), in view of U.S. Patent No. 4,923,565 to Fuentes *et al.* (“Fuentes”). Claims 28, 31-38, 40, 42-44, and 46 were rejected under 35 U.S.C. § 103(a) as being unpatentable over JP ‘299, in view of Fuentes, further in view of U.S. Patent No. 4,548,674 to Hageman *et al.* (“Hageman”). Applicants respectfully traverse these rejections.

Legal Standard

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant’s disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

“There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary

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skill in the art.” *In re Rouffet*, 149 F.3d 1350, 1357, 47 U.S.P.Q.2d 1453, 1457-58 (Fed. Cir. 1998) (The combination of the references taught every element of the claimed invention, however without a motivation to combine, a rejection based on a *prima facie* case of obvious was held improper.). The level of skill in the art cannot be relied upon to provide the suggestion to combine references. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 U.S.P.Q.2d 1161 (Fed. Cir. 1999).

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). “All words in a claim must be considered in judging the patentability of that claim against the prior art.” *In re Wilson*, 424 F.2d 1382, 1385, 165 U.S.P.Q. 494, 496 (CCPA 1970). If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988).

Analysis

*Claims 21-27, 30, 41, 45, and 47-50 are not obvious over Japanese Application 59-9299 (JP '299) in view of U.S. Patent No. 4,923,565 to Fuentes et al. (“Fuentes”)*

*a. Japanese Application 59-9299 (JP '299)*

The '299 patent describes a de-inking agent that can be used for recycling of old paper such as newspapers and magazines. The deinking agent contains a cellulase (page 2, 4th paragraph). The '299 patent states that alkaline cellulases, having an optimum activity between

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pH 8.0 an 11.5, are especially preferred. Examples 1-3 of the '299 patent all disclose the use of NaOH during the disintegration step. This would yield an alkaline pH (i.e., greater than pH 8.0).

**b. U.S. Patent No. 4,923,565 to Fuentes et al. ("Fuentes")**

Fuentes describes an enzyme preparation containing cellulases and/or hemicellulases, which is reacted on a papermaking pulp with an SR at least equal to 25, measured on a pulp in a homogeneous suspension at 2g/l under the conditions of standard NFQ 003 (column 2, lines 39-43). The methods described in Fuentes are applied not to unrefined papermaking pulps, but to pulps which already have high SR values (col. 2, lines 31-33). These high SR values are due to prior mechanical refining and/or to the fact that the pulp has undergone several recycling operations (col. 2, lines 33-38). Defiberization is not the same as deinking. Defiberization involves breaking the hydrogen bonds that hold the cellulose fibers together (see Casey, Pulp and Paper: Chemistry and Chemical Technology, pp. 920-928, (1980) and Smook, Handbook for Pulp and Paper Technologists, pp. 7-8 (1992), copies of which are enclosed as Exhibits A and B, respectively). In contrast, deinking involves breaking the physical bonds between the cellulose fibers and ink binders and/or ink carriers (see Casey, Pulp and Paper: Chemistry and Chemical Technology, page 580, (1980), a copy of which is enclosed as Exhibit C). Traditional deinking uses alkali materials, such as caustic soda, to remove rosin sizing from the paper and to saponify the ink carriers to release the ink particles (*Id.*, p. 580).

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*c. There is no motivation to modify or combine the references*

One of ordinary skill in the art would not be motivated to modify or combine the references to arrive at the claimed methods. As discussed above, JP '299 does not disclose or suggest deinking wasterpaper at a pH between 3 and 8. The Examiner alleges that while JP '299 does not expressly disclose deinking at a pH of between 3 and 8, JP '299 does disclose that acid and alkali can be added (page 4, 3<sup>rd</sup> paragraph). This is not the legal standard for obviousness. The Examiner is attempting to make a rejection under the impermissible "obvious to try" standard and using hindsight to provide the motivation. Specifically, what would have been "obvious to try" would have been to vary all parameters, in this case solvent, acid, alkali, etc., or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful. (*In re O'Farrell*, 853 F.2d 894, 903, 7 U.S.P.Q.2d 1673, 1681 (Fed. Cir. 1988)). JP '299 does not disclose or suggest deinking wastepaper at a pH between 3 and 8. A general disclosure that solvent, alkali, acid, etc. can be added is not a motivation to modify the reference to arrive at the claimed methods. In fact, JP '299 discloses measuring the activity of the cellulase enzyme at a pH of 6.0, yet, in the examples, deinking was performed at an alkaline pH (*see* the declaration of Howard Kaplan, submitted with the amendment and response filed on February 16, 2006 showing that the procedure described in Example 2 of JP '299 is done at a pH of at least 10.59; a copy of the declaration is enclosed as Exhibit D). JP '299 clearly teaches away from the claimed methods.

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With respect to the Kaplan declaration, the Examiner alleges that the declaration is not commensurate in scope with the claims and does not compare the claimed subject matter with the closest prior art. Specifically, the Examiner alleges that the data provided in the declaration provides evidence only for a limited pH range of the claimed method (i.e. 7.44 to 7.66) and that the evidence provided to represent JP '299 only supports a preferred embodiment. The evidence provided by the applications shows delinking at neutral pH with an increase in the pulp whiteness compared to the procedure described in Example 2 of the JP '299. JP '299 provides no guidance for how to perform the described methods other than what is described in the examples. The applicants reproduced the procedure described in Example 2 of JP '299 because that is what the previous Examiner asked applicants to do. It was understood that the enzymes used in JP '299 were no longer available and the closest available equivalents were used. It is unfair to now hold the applicants to a different standard for the sole reason that the case has been transferred to a new examiner. The Declaration of Howard Kaplan clearly shows that the difference in the whiteness of the resulting pulp between the method described in JP '299 and the claimed method is approximately 2.2%, based on *ten* comparisons of the method of Example 2 of the Japanese application with the claimed method. This difference is highly significant, particularly in light of the costs associated with the use of caustic soda at the time applicants filed their application (see the enclosed abstract regarding the cost of caustic soda from 1988-1991). These differences in cost are in excess of \$1 million/year (*see* the abstract from Nerac describing caustic soda prices from 1988-1991 enclosed with the declaration of Howard Kaplan).

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Finally, the Examiner alleges that JP '299 discloses that commonly occurring cellulases can be used without any special restriction, and that such disclosure encompasses non-alkaline as well as alkaline cellulases. The activity range of the cellulase is irrelevant. In determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious to one of ordinary skill in the art at the time of the invention. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 U.S.P.Q. 871 (Fed. Cir. 1983); *Schenck v. Nortron Corp.*, 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983). Claim 21 requires the **deinking** occur at a pH of between 3 and 8. JP '299 does not disclose or suggest this limitation. Dr. Douglas E. Everleigh, in his declaration dated April 12, 2004, which was submitted with the amendment and response filed on August 1, 2005, states that it is his understanding that the '299 patent discloses only the successful use of deinking enzymes with alkaline deinking chemicals such as sodium hydroxide. Dr. Everleigh states that even if one were to read JP '299 as disclosing cellulase activities at all pH ranges, one of ordinary skill in the art would not have been motivated to try deinking at neutral pH, or non-alkaline conditions, because it was thought that alkaline conditions were required to achieve the swelling of the fibers necessary to remove the ink particles. Dr. Everleigh cites a copy of the Paper and Pulp International (PPI) publication entitled "Neutral Deinking Makes Its Debut," a copy of which was submitted with the amendment and response filed on August 1, 2005, describing the breakthrough in October 1993 of deinking in neutral conditions, without the addition of alkalis to the pulp prior to or during

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deinking. Copies of Dr. Everleigh's declaration and the PPI publication are enclosed as Exhibits E and F.

Additionally, a declaration by Dr. Everleigh regarding Japanese Patent No. 63-59494 ("the '494 patent"), was submitted during the prosecution of the parent case, U.S.S.N. 08/239,313 ("the '313 application), which issued as U.S. Patent No. 5,785,809. A copy of this declaration is enclosed as Exhibit G. Although this declaration was not directed to JP '299, Dr. Everleigh discussed the history of using enzymes, such as cellulases, to affect cellulolysis. Specifically, Dr. Everleigh stated that the state of the art at the time the '313 application was filed was that chemical modification and treatment of cellulose fibers was essential and necessary for efficient cellulolysis (*see* page 2, 1<sup>st</sup> full paragraph). Dr. Everleigh stated that one of ordinary skill in the art would consider the deinking action of cellulase alone as novel and unusual.

In order to establish a *prima facie* case of obviousness, the references, alone or in combination, must disclose each and every element of the claims. Fuentes does not disclose or suggest deinking wastepaper at a pH of between 3 and 8. Fuentes does not disclose the elements missing from JP '299. Further, one of ordinary skill in the art would not be motivated to combine the alkaline deinking of JP '299 with the defiberization of Fuentes to arrive at the claimed methods. Accordingly, claims 21-27, 30, 41, 45, and 47-50 are not obvious over JP '299 in view of Fuentes.

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*Claims 28, 31-38, 40, 42-44, and 46 are not obvious over Japanese Application 59-9299*

*(JP '299) in view of U.S. Patent No. 4,923,565 to Fuentes et al. ("Fuentes") further in view of U.S. Patent No. 4,548,674 to Hageman et al. ("Hageman")*

**a. JP '299 and Fuentes**

As discussed above, JP '299 and Fuentes, alone or in combination, do not disclose or suggest a method of de-inking waste printed paper, comprising (a) pulping at a pH between 3 and 8 waste printed paper with an enzyme capable of dislodging ink particles from the waste printed paper in an aqueous medium at a pH between 3 and 8, wherein ink is dislodged from the waste printed paper by action of the enzyme; and (b) removing the dislodged ink particles from the resulting pulp containing medium.

**b. U.S. Patent No. 4,548,674 to Hageman et al. ("Hageman")**

Hageman describes a process for the regeneration of waste paper containing polymer contaminants, wherein the wastepaper is pulped in the presence of an acidic aqueous solution containing at least one peroxide compound. Hageman does not disclose or suggest the enzymatic **deinking** of waste printed paper. In fact, Hageman does not disclose or suggest the use of enzymes. The Examiner alleges that Hageman is applied with respect to the pulping consistency defined in claim 28. Claim 28 is dependent on claim 21, which defines a method of de-inking waste printed paper, comprising (a) pulping at a pH between 3 and 8 waste printed paper with an enzyme capable of dislodging ink particles from the waste printed paper in an aqueous medium at a pH between 3 and 8. Hageman clearly does not provide the elements

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missing from JP '299 and Fuentes. Further, one or ordinary skill in the art would not be motivated to combine Hageman with the alkaline deinking of JP '299 and the defiberization of Fuentes to arrive at the claimed methods. Accordingly, claims 28, 31-38, 40, 42-44, and 46 are not obvious over JP '299 in view of Fuentes further in view of Hageman.

Allowance of claims 21-28, 30-38, 40, and 42-50, as amended, is respectfully solicited.

Respectfully submitted,

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